

EXAMINING THE ROLE OF MINDFULNESS AS A
POTENTIAL MEDIATOR OF THE RELATIONSHIP
BETWEEN GENDER ROLE AND DISORDERED EATING

MELODY K. SORENSON

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by

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Abstract

Mindfulness has garnered empirical support in the treatment of both anxiety and depression, and more recently, in the treatment of binge eating disorder and bulimia nervosa. Research, however, has not yet explored the role of dispositional mindfulness; namely, mindfulness without the benefit of formal training, as a protective factor against disordered eating. This study explored the role of dispositional mindfulness as a mediator of the relationship between gender role and disordered eating. The results of this research suggest that while mindfulness is associated with lower levels of disordered eating, it does not mediate the relationship between gender role and disordered eating, as was hypothesized. The implications of these findings will be discussed within the context of mental health.

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Examining the Role of Mindfulness as a Potential Mediator of the Relationship between Gender Role and Disordered Eating

At any given time, 70% of women and 35% of men are on a diet (Canadian Mental Health Association, 2008). Disordered eating (including such behaviours as bingeing, compensatory behaviours, and preoccupation with food and weight) has become an accepted means of dealing with weight and body image issues, and is largely considered to be normative behaviour for women (Hesse-Biber, Leavy, Quinn, & Zoino, 2006). Although normative, these behaviours constitute core symptoms for eating disorders including anorexia nervosa, bulimia nervosa, and binge eating disorder (DSM-IV, 2000).

It is estimated that between 1% and 8% of the Canadian population will suffer from bulimia nervosa in their lifetime, while 0.4% to 1% of the population will develop anorexia nervosa (CPA, 2006). Statistically, females are more likely to develop an eating disorder, with males accounting for only 5% to 15% of cases of anorexia nervosa and bulimia nervosa, and 35% of cases of binge eating disorder (NIMH, 2008). Numerous theories have attempted to explain why disordered eating is primarily a female phenomenon. One such theory is that of gender role, and cultural stereotypes concerning appropriate behaviours, attitudes, and personality characteristics for men and women (Hepp, Spindler & Milos, 2005). The purpose of this research was to test a meditational model examining the role of mindfulness in the relationship between gender role and disordered eating.

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Gender role is distinct from biological sex, such that an individual can be biologically male but have a feminine gender role. For example, a man may be interested in gardening or staying home with the children, both of which are stereotypically feminine activities. Conversely, a woman may be highly independent and enjoy traveling alone and watching sports. Individuals who identify with a feminine gender role (whether biologically male or female) are more likely to engage in disordered eating behaviours, although the reasons for this are unclear (Meyer, Blissett, & Oldfield, 2001).

Understanding why gender role is a risk factor for disordered eating may provide researchers with a better indication of which elements should be targeted in treatment.

Definitions of the Eating Disorders

As each of the three eating disorders recognized by the Diagnostic and Statistical Manual of Mental Disorders (APA, 2000) are characterized by distinct core eating behaviours, it is important not only to recognize their common elements, but to be able to distinguish accurately between them. Anorexia nervosa is characterized by a drive for thinness, often to the point of emaciation. Individuals with anorexia perceive themselves to be overweight even though they may be significantly underweight, and exhibit an intense fear of gaining weight. They may obsessively count calories and engage in food-related rituals, such as cutting their food into small pieces or eating only one type or colour of food. Due to a lack of healthy nutrition and body fat, women with anorexia often cease to menstruate, a condition known as amenorrhea, and complain of being cold due to a decrease in core body temperature. Over time, anorexia can lead to complications such as anaemia, muscle deterioration, and osteoporosis (NIMH, 2008).

The American Psychological Association (1998) reports that one in ten cases of anorexia end in death from starvation, suicide, or medical complications associated with the disease.

Bulimia nervosa is characterized by repeated episodes of bingeing (the consumption of an excessive amount of food in a short period of time), followed by compensatory behaviours such as purging (e.g., vomiting, laxative, and diuretic abuse) or excessive exercise (APA, 2000). Bingeing is usually done in secret, and often results in intense feelings of guilt and shame. Unlike anorexia nervosa, individuals with bulimia nervosa are often of normal weight, but like anorexia nervosa they fear gaining weight and are unhappy with their body size. Other common complications associated with bulimia nervosa include tooth decay (due to stomach acids repeatedly being expelled), intestinal and kidney problems, and severe dehydration (NIMH, 2008).

Binge eating disorder, like bulimia nervosa, is characterized by recurrent episodes of bingeing, where the individual consumes a large amount of food and experiences accompanying feelings of shame and guilt and a lack of control over eating behaviours. With binge eating disorder, however, no purging or compensatory behaviours are present and as such, these individuals are often overweight. Men are more likely to suffer from binge eating disorder than from either anorexia or bulimia nervosa (CMHA, 2009). This raises some important questions about why gender is associated differentially with eating disorders. Why are men more likely to binge than to engage in restrictive eating behaviours? Gender role theory may help to explain why certain gender roles are associated more or less strongly with each of the eating disorders in men and women.

Gender Role Theory

Masculinity and femininity have historically been conceptualized as two opposite ends of a single continuum (Bem, 1974). Thus, an individual could be either masculine or feminine, but not both. More recently, masculinity and femininity have been conceptualized as two separate dimensions which are independent of one another (Hepp, et al., 2005). Thus, an individual may integrate both masculine and feminine traits into their gender role orientation. This is the approach taken by the author of the Bem Sex Role Inventory (Bem, 1974), one of the more commonly used measures of gender role. Bem (1974) not only proposed that masculinity and femininity were independent constructs, but suggested that an individual could integrate varying levels of both into their self-concept. A person would be classified as masculine if they demonstrated significantly more of the masculine attributes, and feminine if they demonstrated significantly more feminine attributes. Bem (1974) also introduced the concept of androgyny, the equal demonstration of both masculine and feminine attributes, and suggested that androgyny might be more psychologically healthy than being strongly sex-typed. Spence and colleagues (1975) later argued that there was a difference between individuals who demonstrate a high number of both masculine and feminine traits (androgynous), and those who demonstrate an equal, but low number of each, and termed this group of individuals undifferentiated.

It has been suggested that strict adherence to a traditional gender role may limit the range of behaviours an individual may engage in (Bem, 1974). Bem and Lenney (1976) asked participants to perform simple tasks while being photographed. As an

incentive for each task completed participants earned a small amount of money. Some of the tasks were stereotypically feminine tasks (e.g., ironing a cloth napkin), while others were stereotypically masculine tasks (e.g., baiting a fishing line). However, all tasks were simple and could be performed easily by either gender. In this experiment some tasks were worth more than others, particularly those which were not “gender-appropriate”. For example, a female participant might earn 4 cents for baiting the fishing line, while only earning 2 cents if she chose to iron the cloth napkin. The majority of gender-typed participants chose the activities that were appropriate for their gender even when it meant they would earn less money; however, the androgynous individuals, who were not constrained by gender roles, chose the activities which would earn them the most money. The results of the study indicated that gender-typed individuals make decisions about their behaviour based on whether or not it will conform to gender-role stereotypes, and actively avoid engaging in behaviours which are not “gender-appropriate” (Bem & Lenney, 1976). One possible explanation for this avoidance of “gender-inappropriate” behaviours is gender role stress (Eisler & Skidmore, 1987; Gillespie & Eisler, 1992).

Gender Role Stress

The gender role with which individuals identify has been shown to be a factor in the development of disordered eating attitudes and behaviours. Strong adherence to a traditional feminine gender role predicts an increased likelihood of developing an eating disorder (Murnen & Smolak, 1997; Martz, Handley, & Eisler 1995; Bekker & Boselie, 2002). It has been suggested that thinness and attractiveness are prominent components of the traditional feminine gender role (Striegel-Moore, Silberstein, & Rodin, 1986).

Women may experience stress in situations which challenge their femininity, particularly when it relates to such prominent components of their femininity as their physical appearance. This stress is known as feminine gender role stress (Gillespie & Eisler, 1992). Women who are high in feminine gender role stress are believed to see the world and the people around them as judgmental and disapproving of their appearance, which may make them more vulnerable to eating disorders (Martz et al., 1995). In a study by Martz and colleagues (1995), women had either their body fat and weight measured (stress condition), or their visual and auditory skills checked (control condition). The women who were high in feminine gender role stress reported higher levels of anxiety regardless of the condition, and had elevated heart rate during the stress condition. The researchers suggested that women who experienced this stress when having their body fat measured are also likely to interpret daily events such as viewing themselves in a mirror or trying on clothes as stressful or threatening to their femininity.

Masculine gender role stress (Eisler & Skidmore, 1987) has likewise been suggested as a contributing factor in the development of disordered eating patterns among males. Masculine gender role stress, although conceptually similar to feminine gender role stress, involves different stressors. The situations that women find stressful and threatening are not necessarily the same ones that men would find stressful. This was acknowledged with the creation of two independent stress scales: the Feminine Gender Role Stress Scale (FGRS; Gillespie & Eisler, 1992) and the Masculine Gender Role Stress Scale (MGRS; Eisler & Skidmore, 1987). Muscularity and leanness can be argued to be prominent aspects of the traditional masculine gender role, and are thought to be

implicitly associated with many of the stereotypically masculine traits, such as dominance and assertiveness. Men may pursue a lean, muscular body to combat the stress that results from deviance from the traditional masculine gender role, improving their bodies in an attempt to meet this ideal (Mussap, 2008). Masculine gender role stress among males is associated with body dissatisfaction, drive for muscularity, drive for thinness, and dietary restraint (Mussap, 2008). Snyder and Hasbrouck (1996) suggest that gender-role stress may be a stronger predictor of disordered eating than the actual gender role with which individuals identify.

Masculinity and Femininity: How do they Relate to Disordered Eating?

Research into the relationship between gender role and disordered eating has produced mixed results. In one study, femininity was associated with disordered eating and masculinity was negatively related to disordered eating (Meyer et al., 2001). However, Cantrell and Ellis (1991) have reported that masculinity in both sexes is related to weight preoccupation, while for women, femininity is also associated with weight preoccupation. These contradictory results are not uncommon in the literature; however, a meta-analysis based on 23 studies that included measures of both gender role and disordered eating found that mean femininity scores for participants who exhibited elevated levels of disordered eating were significantly higher, and masculinity scores significantly lower, than those of non-disordered groups. Effect sizes were small, and comparable for both clinical and non-clinical samples (Murnen & Smolak, 1997). This raises important questions about the role of masculinity in disordered eating. Rather than differing solely on femininity, the disordered groups also exhibited lower levels of

masculinity than a control group of healthy peers, suggesting that masculinity may also be related to disordered eating. Klingenspor (1994) found that women with bulimia reported lower masculinity scores than a matched comparison group, and suggested that the failure to adopt masculine traits may be a risk factor for the development of bulimic behaviours. A subsequent study by the same authors found that femininity was negatively related to bulimic symptoms, while research by Lewis and Johnson (1985) showed women with bulimia reporting lower femininity scores than healthy controls.

Although there is some disagreement concerning which of the gender roles is most closely linked to disordered eating, the majority of studies continue to show that high femininity, and a lack of masculine traits is related to disordered eating, at least in women. It is important to note that clinical samples may differ significantly from non-clinical samples. Hepp and colleagues (2005) have suggested that the gender role of clinical participants may change over the course of their illness. Therefore, the relationship of gender role to disordered eating may also be altered by the course of the disorder. Sitnick and Katz (1984) offer the same caution and suggest that the eating-disordered patient's gender role may be a function of the illness itself. Those living with a serious and chronic illness may experience a decrease in effectiveness, confidence, and assertiveness, attributes which masculinity subscales are designed to measure. Therefore, it may not be realistic to try and compare community and clinical samples in eating disorder research.

Pritchard (2008) has also suggested that because many studies look only at the dimensions of masculinity and femininity, the inclusion of androgynous and

undifferentiated individuals in the analysis may provide us with more information as to the role of gender role in disordered eating. To test this theory, Pritchard (2008) investigated the relationship of each of the four gender roles (masculine, feminine, androgynous, and undifferentiated) to disordered eating behaviours in both sexes. A significant effect of gender role was found for bulimia symptomatology and for body dissatisfaction, with undifferentiated and masculine women scoring significantly higher on the bulimia scale than androgynous women. Women high in either masculinity or femininity also reported more body dissatisfaction than androgynous women. Among the men, gender role was significantly associated with body dissatisfaction. Both feminine and undifferentiated men had higher body dissatisfaction scores than masculine or androgynous men. Thus, the inclusion of androgynous and undifferentiated categories yielded differences between the four groups that might not have been evident if the sample had included only those classified as masculine or feminine.

In a related study Hepp and colleagues (2005) found that among individuals who met diagnostic criteria (DSM-IV) for an eating disorder, androgynous individuals reported significantly less body dissatisfaction than undifferentiated or feminine individuals. These findings would suggest that, for both sexes, high levels of both masculine and feminine traits (androgyny) could be viewed as a protective factor (Hepp, et al., 2005; Meyer et al., 2001; Sitnick & Katz, 1984). Individuals who are able to integrate both masculine and feminine traits have a larger range of behaviours available to them, rather than being restricted to behaviours which are “gender-appropriate” (Hepp et al., 2005).

Androgyny seems to be associated with positive outcomes for both sexes, including higher levels of self-esteem than that found in masculine or feminine individuals (Spence, Helmreich, & Stapp, 1975). It should be noted, however, that masculinity and femininity were also positively associated with self-esteem, but that androgyny was related to significantly higher levels of self-esteem in both sexes (Spence, et al., 1975). Perhaps then it is not that masculine or feminine traits are necessarily a risk factor for disordered eating, but the inability of individuals to integrate both into their self-concept that may put them at increased risk. The integration of positive (and possibly, protective) masculine characteristics may be an important area to be targeting in treatment.

The Treatment of Disordered Eating and Eating Disorders

Traditional Therapy for the Treatment of Disordered Eating

Cognitive-behavioural therapies (CBT) have been widely used to treat individuals with eating disorders. Traditional cognitive-behavioural therapies typically involve identifying problem areas or behaviours, choosing desired goals with the client, and selecting the appropriate means to reach these goals (Hofman & Asmundson, 2008). Cognitive-behavioural therapies have been demonstrated to be very effective in the treatment of bulimia nervosa (Shapiro, Berkman, Brownley, Sedway, Lohr, & Bulik, 2007) and are generally considered the treatment of choice for this disorder (Gowers, 2006). The evidence suggests, however, that CBT may be only moderately effective in the treatment of anorexia nervosa (Gowers, 2006). In light of this consideration, it is important to explore alternative therapies that may address some of the shortcomings of

the cognitive-behavioural approach in treating disordered eating, and anorexia nervosa specifically.

A promising new adjunct to traditional cognitive-behavioural therapies are mindfulness-based treatments. Unlike some cognitive-behavioural therapies, in mindfulness-based therapies clients are not taught to challenge their thoughts directly or to engage in problem-solving strategies or emotion-regulation (Baer, Fischer & Huss, 2005). The goal is simply to accept thoughts, feelings, and phenomena as they occur, without trying to change, escape, or avoid them (Baer et al., 2005).

Mindfulness

The process of increasing awareness and acceptance of one's thoughts and emotions has received support in the treatment of disordered eating (Kristeller & Hallett, 1999) and body image disturbances (Stewart, 2004). In contrast to rumination, which involves focusing or dwelling on negative affective states with little or no problem-solving or strategizing (Nolen-Hoeksema & Jackson, 2001), mindfulness involves bringing one's attention to what is occurring in the present moment, and being attentive to both internal and external phenomena (Baer, 2003; Brown & Ryan, 2003), as well as being open to new information and experiences (Stewart, 2004). It can be described as the nonjudgmental awareness and acceptance of one's emotions, cognitions, and sensations without comparison or evaluation of their significance, truth, or rationality (Baer, Smith, & Allen, 2004; Baer et al., 2005; Grossman, Nieman, Schmidt, & Wallach, 2004; Stewart, 2004).

Mindfulness is associated with lower levels of anxiety and depression (Miller,

Fletcher, & Kabat-Zinn, 1995; Zvolensky, Solomon, McLeish, Cassidy, Bernstein, Bowman, et al., 2006), increased positive affect (Zvolensky et al., 2006), and increased life satisfaction, optimism, and self-esteem (Brown & Ryan, 2003). A meta-analysis of mindfulness-based treatment programs found that among those programs which included a control group, mindfulness was associated with positive physical and mental health in both clinical and non-clinical populations (Grossman et al., 2004). These findings lend support for the idea that mindfulness may enable clients to better cope with daily stressors, as well as during times of extreme stress and disability (Grossman et al., 2004).

Baer and colleagues (2004) have identified four major components of mindfulness. The first of these, Observing, involves noticing and consciously paying attention to stimuli (e.g., thoughts, emotions, sensations) as they arise. The second component is Describing, the ability to label or put words to what one experiences (e.g., "I am feeling disappointed because I did not do well on my exam"). The third component has been labelled Acting with Awareness. This refers to being fully engaged in whatever is occurring in the present, without distraction or divided attention. The last component is Acceptance without Judgement, and refers to the acceptance of what is occurring in the present, without attempting to evaluate, change, or escape it.

Mindfulness-based treatment for disordered eating. Mindfulness may be practiced through meditation-type exercises, where the client learns to focus their attention on their thoughts, feelings, perceptions (e.g., what they see and hear), as well as stimuli in their environment (Baer et al., 2005). These exercises are thought to enhance self-awareness and acceptance as the participant learns to simply observe what is going

on within and around them, rather than judging and evaluating these experiences (Baer et al., 2005).

In mindfulness-based therapies, clients are encouraged to view their thoughts as fleeting and unstable rather than as objective facts (Baer et al., 2005). Thoughts and sensations are viewed as separate from the individual, and no attempts are made to change or avoid them (Baer, 2003). When eating, clients are encouraged to observe and to experience the sensations of taste and the feeling of fullness that accompanies feeding (Brown & Ryan, 2003). Mindfulness training may also enable the client to adopt a more compassionate and neutral stance towards their body, leading to less emotional distress and a decreased likelihood of engaging in impulsive behaviours such as body checking and restrictive eating, in response to body image triggers (Stewart, 2004). In a truly mindful state, stimuli that were once triggers for negative mood and body image (e.g., media images of thin women, trying on a bathing suit) are observed and described without emotional or behavioural reaction (Stewart, 2004).

Through the practice of self-directed attention, clients may be increasingly exposed to thoughts, experiences, or emotions that would once have stimulated avoidance behaviours (Baer, 2003). In an exploratory study by Arch and Craske (2006), participants were assigned to one of three groups: 1) focused breathing, 2) worry, or 3) unfocused attention. Those in the focused breathing group were asked to sit still and focus on the air entering and leaving their bodies, while the worry group was given a list of categories to worry about (e.g., finances, career, family). The unfocused attention group was asked to sit and think about whatever came to mind, without trying to focus on any one topic in

particular. They were then shown a series of slides designed to induce positive or negative affective states. After the experiment, participants were asked if they would be willing to view an optional series of 25 slides, which had been rated as being the most aversive. More participants in the focused breathing group (85.7%) agreed to view all 25 optional aversive slides, compared with the unfocused group (57.9%). This would seem to suggest that mindfulness may lead to decreased responsiveness or greater tolerance to negative or aversive stimuli, although no significant differences were found between the focused breathing and worry groups (Arch & Craske, 2006).

According to Stewart (2004), individuals with body image disturbances often interpret neutral appearance-related messages from media, peers, and family in a negative manner. As part of mindfulness training for body image or eating disturbances, it is important to cultivate an environment of neutrality, where the client increasingly learns to accept their body, and reject the idea that their body needs to be changed in order to be acceptable (Kristeller & Hallett, 1999). Mindfulness training may enable the individual to neutrally observe these messages, rather than accepting them as true and valid statements about their body (Stewart, 2004). For example, the comment "That shirt's not fitting right; you should try another size" could be interpreted negatively (e.g., "I am too fat for this shirt"), or in a neutral manner (e.g., "This particular shirt does not suit my body type").

As part of an exploratory study of the effectiveness of mindfulness-based therapies, a group of 21 obese women participated in a 6-week mindfulness-based group intervention for binge-eating disorder. During this program the women were encouraged,

among other things, to engage in general mindfulness meditation and to be mindfully aware and present when eating. During a follow-up assessment the women reported a significant increase in perceived control of eating behaviours, as well as a significant decrease in number of binges, levels of reported anxiety, and depression. The women also reported having a greater awareness of personal triggers for binge eating and felt better equipped to deal with these triggers in mindful ways, such as through journaling or deep breathing practices (Kristeller & Hallett, 1999). Another study reviewing a mindfulness-based treatment for bulimia nervosa found that women who received this particular treatment reported feeling more self-aware, assertive, self-accepting, and hopeful after completion of the program (Proulx, 2008). They also reported that they engaged in fewer impulsive or self-destructive behaviours (Proulx, 2008). The results of these two studies would suggest that while mindfulness-based treatments are still in the early stages of development and evaluation, there may be some potential for helping to decrease disordered eating symptomatology.

Mindfulness-based treatment programs may also facilitate the development of self-acceptance and help to lessen some of the perfectionist impulses and beliefs that often accompany eating disorders (Sherry, Hewitt, Besser, McGee & Flett, 2004; Castro-Fornieles, Gual, Lahortiga, Gila, Casulà, Fuhrmann et al., 2007). Perfectionism has been associated with both anorexia and bulimia (Bardone-Cone, 2007; Bardone-Cone, Wonderlich, Frost, Bulik, Mitchell, Uppula, et al., 2007; Bulik, Tozzi, Anderson, Mazzeo, Aggen, & Sullivan, 2003; Sherry et al., 2004), and is associated with poor treatment prognosis in individuals with anorexia nervosa (Bardone-Cone et al., 2007).

Although the majority of the mindfulness literature has focused on mindfulness training, mindfulness is a cognitive skill that can be present in individuals without formal training, also known as dispositional mindfulness (Lavender, Jardin, & Anderson, 2009). It is important to understand individual differences in this trait in individuals who have not received any formal mindfulness training, as there is considerable variation in the degree to which individuals engage in mindful awareness (Brown & Ryan, 2003).

The Present Study

This study was designed to investigate the degree to which participants engage in mindful awareness in relation to their eating attitudes and behaviours. The literature thus far has not addressed mindfulness as a dispositional variable, and has only looked at the efficacy of mindfulness-based treatment programs for the eating disorders (and for the most part only for binge eating disorder). Using a quantitative approach, this research examined the role of mindfulness as a possible mediator of the relationship between gender role and disordered eating in a student sample.

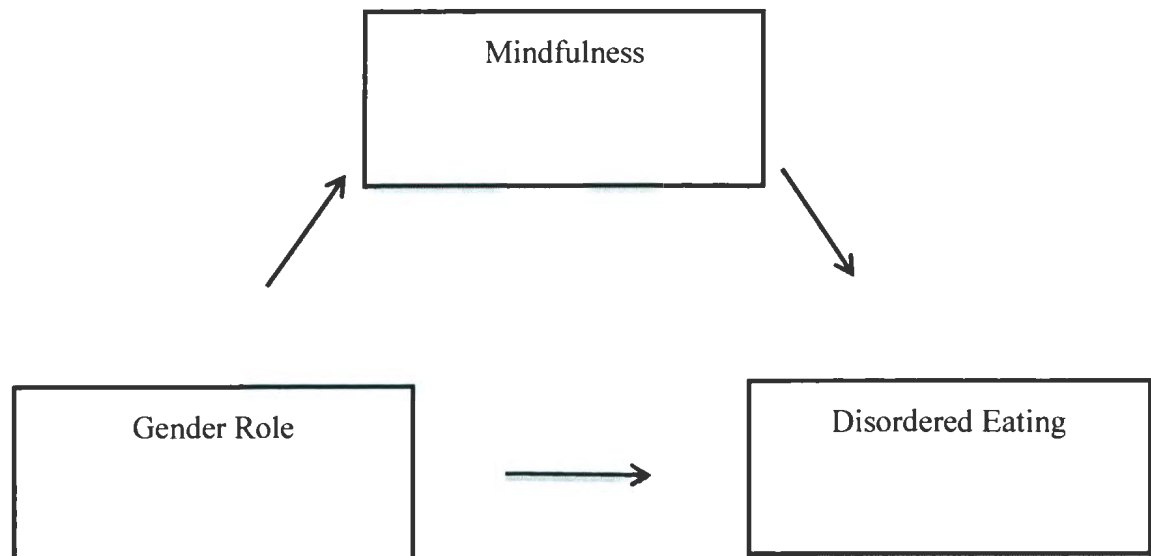
While sex differences are not apparent in rates of mindfulness (Baer et al., 2004), the present research was designed to explore whether individual differences in mindfulness may be attributed to one's gender role, rather than to their biological sex. As noted previously, gender role is not an either/or variable, but something that exists on a continuum. For the purposes of this research, gender role served as an independent or predictor variable.

It was hypothesized that greater levels of mindfulness would be associated with lower incidences of disordered eating among men and women. As dispositional

mindfulness has been associated with several positive mental health outcomes (Brown & Ryan, 2003; Miller et al., 1995; Zvolensky et al., 2006), it was expected that this would also include positive eating behaviours and attitudes. It was hypothesized that there would be a significant gender role difference with regards to mindfulness skills, with more masculine individuals reporting greater levels of mindfulness, and more feminine individuals reporting lesser degrees of mindfulness. As women are more likely to ruminate than men (Nolen-Hoeksema & Jackson, 2001), rumination may be part of the stereotypical feminine gender role, and research has shown that rumination is incompatible with mindfulness (Coffey & Hartman, 2008). Therefore, it was hypothesized that those who identified with a feminine gender role whether male or female, may be more likely to ruminate, and therefore, less likely to be mindful.

It was further hypothesized that femininity would be associated with higher levels of disordered eating and that masculinity and androgyny would be associated with healthier eating attitudes and behaviours. No predictions were made as to the relationship of the undifferentiated gender role to disordered eating, as there was not enough existing research to support a prediction in one direction or the other, and these cases are sometimes discarded by researchers (Cheng, 2005). Lastly, a meditational model was hypothesized, and this model predicted that mindfulness would mediate the relationship between gender role and disordered eating (see Figure 1). This hypothesized model was exploratory in nature, with the goal of explaining why gender role is related to disordered eating.

Figure 1. Proposed mediational model of disordered eating.



Method

Participants

A sample of 134 participants (98 females, 36 males) were recruited from an undergraduate psychology course at Memorial University of Newfoundland. Eleven cases were removed from the sample due to extensive missing data. In each of these cases, the participant had neglected to complete a full page of a questionnaire, resulting in between 5 and 19 sequential missing items. This resulted in a final sample of 123 participants (91 females, 32 males). The sample ranged in age from 18 to 43, with a mean age of 21.03 years ($SD = 3.41$), and the majority of the sample identified their ethnicity as Caucasian (95.1%), and self-identified as heterosexual (96.7%). Thirty-six percent of the sample ($N = 43$) reported having experience with meditation (e.g., yoga). Participants were asked to complete a brief demographic questionnaire and a standardized battery of measures, described below.

Measures

Demographics questionnaire. A demographics questionnaire was designed for this study. This measure included items relating to age, gender, ethnicity, personal and family history of mental illness, sexual orientation, and experience with meditation (see Appendix C).

Bem Sex-Role Inventory (BSRI; Bem, 1974). The BSRI is comprised of 60 items, containing 20 masculine (e.g., *independent, assertive*), 20 feminine (e.g., *nurturing, loves children*) and 20 neutral items (e.g., *honest, trustworthy*). These items were chosen not on the basis of high endorsement by males or females but by the degree to which each trait

was believed to be socially desirable for a man or a woman at the time of the scale's development (1970's), based on results from a large sample of students. Thus, a high degree of endorsement of masculine or feminine traits would indicate that the individual is strongly sex-typed. It should be noted that half (10) of the neutral items are negative traits (e.g., *jealous*, *inefficient*). Each participant is asked to rate him or herself on each item, using a 7-point scale, ranging from 1 (*never or almost never true*) to 7 (*always or almost always true*). The femininity and masculinity scores are calculated by separately averaging the scores for all of the feminine items, and for the masculine items, resulting in two independent scores. These scores will be in the 1-7 range. On the basis of these two scores, an individual may be classified as masculine, feminine, undifferentiated, or androgynous. Masculine individuals possess a high number of stereotypically-masculine traits and a low number of stereotypically-feminine traits. Feminine individuals, likewise, possess a high number of stereotypically-feminine traits and a low number of stereotypically-masculine traits. Androgynous individuals possess a high number of both masculine and feminine traits, and undifferentiated individuals possess a low number of both masculine and feminine traits.

The original method of calculating the degree of sex-typing for each individual involved calculating a difference score based on the individual's scores on the masculinity and femininity scales, using t-scores. If the difference score was non-significant (i.e., there was not a significant difference between the individual's masculinity and femininity scores) then that individual would be classified as androgynous. The problem with this method is that it failed to take into account that there

might be differences between those who were classified as androgynous based on high endorsement of both masculine and feminine items and those who expressed low endorsement of the attributes associated with masculinity and femininity. Thus, a new method of scoring was suggested by Spence, Helmreich and Stapp (1975), which used the sample mean for the masculine and feminine items to calculate each individual's androgyny score. This median split separates high-high and low-low scorers, which had previously been grouped together under the category of androgynous during the initial construction and testing of the BSRI. Now these two groups were separated into androgynous (high-high) and undifferentiated (low-low).

A social desirability score may also be calculated by averaging the scores for the 20 neutral items (after reverse-scoring the negative items). This score will also be in the 1-7 range, with higher scores indicating greater social desirability. The masculinity and femininity scales appear to be independent of one another, with correlations ranging between - .02 to .11, during the initial testing of the instrument. Reliability estimates range from .80 (Femininity) to .86 (Masculinity), with reliability .75 for the Social Desirability scale. The BSRI has been shown to be highly reliable, with test-retest reliability ranging from .89 to .93 over a four-week period (see Appendix D).

Eating Attitudes Test 26 (EAT-26; Garner, Olmstead, Bohr, & Garfinkel, 1982).

The EAT-26 is the short form of the Eating Attitudes Test - 40 which was developed by Garner and Garfinkel (1979). It was designed to differentiate between those at risk for eating disorders and healthy individuals. The original EAT-40 was tested on a sample of individuals with anorexia, healthy males and females, obese females, and a sample of

individuals who had recovered from anorexia. Factor analysis revealed three major factors: Dieting (13 items), Bulimia (6 items), and Oral Control (7 items). In total, these three factors account for 40.2% of the total variance in individual scores. Fourteen of the original items did not fit into either of these factors, and were thus discarded, leaving 26 items. Factor 1 (Dieting) measures a preoccupation with weight and thinness (e.g., “*Am terrified about being overweight*”), and is highly correlated with the total EAT-26 score ($r = .93$). Factor 2 (Bulimia) reflects a preoccupation with food and is related to higher body weight (e.g., “*Have the impulse to vomit after meals*”). This factor shares a moderate correlation with the total EAT-26 score ($r = .64$). Factor 3 (Oral Control) is associated with lower body weight and the absence of bulimia (e.g., “*Like my stomach to be empty*”), and is also moderately related to total EAT-26 scores ($r = .60$). Each item is rated on a 6-point scale, based on how often the participant engages in the activity in question. Items which receive a rating of *always*, *usually*, or *often* receive a score of 3, 2, and 1 respectively. Items which receive a rating of *sometimes*, *rarely*, or *never* receive a score of zero. Occasional episodes of disordered eating are not captured by this instrument. For example, if a participant reports that they “*sometimes*” eat diet foods, they would receive a score of zero on that item. This helps to ensure that only those who are genuinely exhibiting more serious symptoms of disordered eating (e.g., “*most of the time*” eat diet foods) are captured by this instrument. Total scores can range from 0 – 78, with higher scores indicating greater eating pathology. A cut-off score of 20 is generally suggested to detect at-risk clients. Overall reliability estimates for the EAT-26 were found to be .90 in a sample of individuals with anorexia (see Appendix E).

Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004).

The KIMS is a 39-item self-report scale designed to measure four facets of mindfulness: observing, describing, acting with awareness, and acceptance without judgment. The Describe subscale of the KIMS measures an individual's tendency to put their experiences, emotions or thoughts into words. The Act with Awareness subscale captures the tendency to engage in one's daily activities with undivided attention, being fully present throughout. The Acceptance without Judgment subscale is a measure of the degree to which the individual is able to accept reality and experiences as it is, without applying labels such as good/bad, right/wrong. Lastly, the Observe subscale of the KIMS captures one's tendency to attend to and take notice of emotions, cognitions and stimuli in the environment. Items on the KIMS include "*I notice when my moods begin to change*" and "*It's hard for me to find the words to describe how I'm feeling*". Several of the items are reverse-scored. Participants are asked to indicate the degree to which each statement describes them using a 5-point Likert scale, ranging from 1 (*never or very rarely true*) to 5 (*always or almost always true*). Total scores on the KIMS can range from 39 to 195, with higher scores indicating greater levels of mindfulness. Internal consistency values for the factors are as follows: Observe (.91), Describe (.84), Acting with Awareness (.83), and Acceptance Without Judgement (.87), with test-retest reliabilities ranging from .65 to .86 after 14-17 days. No gender differences were found during the development and testing of the KIMS (see Appendix F).

Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003). The MAAS assesses the degree to which individuals are aware of, and attentive to what is

occurring in the present. In this regard, the MAAS unlike the KIMS, emphasizes the attentional characteristics of mindfulness. The MAAS is comprised of 15 items, to which participants rate the frequency of their experience with each item on a 6-point Likert scale, from 1 (*almost always*) to 6 (*almost never*). Items include “*I find myself doing things without paying attention*” and “*I find it difficult to stay focused on what’s happening in the present*”. Scores on the MAAS may range from 15 to 90, with higher scores indicative of greater levels of mindfulness. The MAAS has been tested on both college and adult samples of the population, and no gender differences were found. Internal consistency for the MAAS is high, with alpha .82 for the student sample and .87 for the adult sample, and test-retest reliability was found to be .81, over a four-week period (see Appendix G).

Procedure

A sample of undergraduate psychology students was recruited via a series of classroom visits, and were offered partial course credit (2%), as incentive for their participation in this research. This protocol was approved by the Interdisciplinary Committee for Ethics in Human Research (ICEHR). During the classroom visit, students were provided with an information letter which further explained the purpose of the study, as well as the risks and benefits of participation (see Appendix A).

Potential participants were told that the purpose of the research was to gather data on a number of mental health outcomes in a student population, and were informed that their participation was both voluntary and confidential. Students were also given the option to complete a brief one-page position paper in lieu of participating in the research,

to earn the same amount of course credit. The position paper was graded by the principal researcher and required roughly the same amount of time and effort to complete as the questionnaires (30 - 40 minutes).

Participants were given a 10" x 13" envelope containing the five questionnaires and consent form (see Appendix B). The outside of the envelope contained a label with the course number and the return-by date, as well as the location of the researcher's office, where the questionnaires were to be returned. The first form in the packet was the consent form, which outlined the purpose of the study, as well as the risks and benefits of participation. The consent form mirrored in content the cover letter that the students received during the classroom visit. Participants were also provided with the contact information for Student Counseling Services and a toll-free Mental Health Crisis Line, should any issues or concerns have arisen during the course of the study. The remainder of the questionnaires were counterbalanced using the latin square method. This method helps control for both order and place effects. The participants were asked to drop off their completed packets in the principal researcher's office during the two weeks following the classroom visit, and were provided with a separate envelope in which to seal their signed consent form, so that their name would not be attached to their responses. Participants were asked to place the envelope containing their signed consent form into a larger, clearly identified envelope which contained all of the returned consent forms. A debriefing protocol was posted on the course website, and participants were invited to contact the principal researcher, should they wish to learn more about the study.

Results

Missing Data and Data Analysis

Table 1 presents descriptive data for all measures used in the study. Tabachnick and Fidell (2007) have stated that if a data set is missing less than 5%, any procedure for data replacement will yield similar results. Altogether, less than 2% of data points were missing from the data set, and a subsequent analysis of missing data revealed that no single item was missed by more than 3.3% of the sample. Missing data were replaced using item-mean replacement, as this is a conservative way to estimate missing data, but one which does not reduce variance as much as overall mean substitution (Tabachnick & Fidell, 2007).

Reliability and Validity of Measures

With the exception of the Oral Control subscale of the EAT-26 and the Act with Awareness subscale of the KIMS, all measures performed well, in terms of internal consistency (see Table 1). As noted, the Oral Control subscale did not reach an adequate level of reliability, with a coefficient alpha of .58, nor did the Act with Awareness subscale of the KIMS ($\alpha = .67$). Most researchers use a conservative value of .70 as a cut-off point for adequacy (Cortina, 1993; Schmitt, 1996). As these two subscales did not attain an adequate level of reliability, no analyses were conducted with these two subscales.

Overall, the measures performed as expected, with a moderate correlation between the two measures of mindfulness, the KIMS and the MAAS ($r = .57, p = .00$). The pattern of correlations between the KIMS subscales and the MAAS were as

expected: Observe ($r = .04, p = \text{ns}$), Describe ($r = .33, p = .00$), Act ($r = .41, p = .00$), Accept ($r = .49, p = .00$), similar to what Baer and colleagues (2004) found during the development and testing of the KIMS.

Lastly, the Masculine and Feminine factors of the BSRI were independent from one another, ($r = .06, p = .49$), in accordance with Bem's (1974) conceptualization of masculinity and femininity as two independent constructs.

Relationships between Demographic Variables and Outcome Measures

There was a significant difference in mean total EAT-26 scores between male and female participants, ($M_{\text{male}} = 4.69, SD = 4.50; M_{\text{female}} = 11.64, SD = 10.69$), [$t(121) = -3.56, p = .00$]. Sex differences were also found for the Dieting, [$t(121) = -3.63, p = .00$], and Bulimia, [$t(121) = -2.49, p = .01$] subscales of the EAT-26, with females reporting significantly higher levels of disordered eating than males. There were no sex differences between scores on the Oral Control subscale of the EAT-26, [$t(121) = -.84, p = .40$]. Female participants also reported a much wider range of scores (0 - 48), while male participants exhibited a more restricted range of scores (0 - 18). Of the 18 participants (15%) whose scores fell above the cut-off of 20 on the EAT-26, all were female.

No significant sex differences were found among total scores on the KIMS, [$t(121) = 1.49, p = .14$], or the MAAS, [$t(121) = .99, p = .32$]. Age was significantly positively related to mindfulness, as measured by the KIMS, ($r = .20, p = .03$); however, age was not related to scores on the MAAS, ($r = -.04, p = .67$). Age was not related to disordered eating, ($r = .03, p = .72$), nor was it related to the subscales of the EAT-26.

Table 1

Descriptive Statistics (N = 123) for each of the Measures Used

	Range	Mean	SD	<i>Alpha</i>
<hr/>				
BSRI				
Masculinity	2.30 – 6.80	4.77	.77	.87
Femininity	2.15 – 6.25	4.90	.63	.82
EAT - 26	0 – 48	9.83	9.94	.92
Dieting	0 – 32	6.24	7.42	.93
Oral Control	0 – 12	1.76	2.06	.58
Bulimia	0 – 11	1.82	2.64	.79
KIMS	88 – 155	123.24	12.51	.78
Observe	19 – 51	36.47	7.23	.84
Describe	13 – 36	26.54	4.50	.71
Act with Awareness	16 – 43	29.81	4.29	.67
Acceptance w/o Judgment	9 – 44	30.41	7.12	.91
MAAS	21 – 87	63.11	11.30	.87
<hr/>				

Note. BSRI: Bem Sex Role Inventory; EAT-26: Eating Attitudes Test – 26; KIMS: Kentucky Inventory of Mindfulness Skills; MAAS: Mindful Attention and Awareness Scale

Individuals with a family history of an eating disorder ($N = 11$) reported significantly higher levels of disordered eating ($M = 18.55$, $SD = 12.42$) compared to those without such a family history ($M = 9.15$, $SD = 9.37$), [$t(118) = -3.07$, $p = .00$], and family history was found to be a significant predictor of disordered eating, [$F(1, 118) = 9.45$, $p = .00$, $R^2 = .07$].

In this sample, the majority (68%) of participants reported having no experience with meditation; however, individuals who did report a history of meditation experience reported significantly greater levels of mindfulness, as measured by total scores on the KIMS, [$t(117) = 3.57$, $p = .00$]. When mindfulness was measured using the MAAS, however, those with meditation experience did not report higher mindfulness scores than those without such experience, [$t(117) = .40$, $p = .67$].

Gender Role Categories

Within each of the four gender role categories, as measured by the BSRI, there were approximately the same number of participants (see Table 2). There was little variance among scores on the Masculine ($SD = .77$) and Feminine ($SD = .63$) subscales of the BSRI, thus the four gender role categories did not differ much from one another in their identification with the attributes associated with masculinity and femininity.

Gender Role and Disordered Eating

It was hypothesized that feminine individuals would report significantly greater levels of disordered eating than masculine or androgynous individuals; however, there were no significant differences among the four gender role categories, with respect to total EAT-26 scores. On the Bulimia subscale, the Androgynous group reported higher

scores than the Undifferentiated group, [$t(58) = 2.14, p = .04$]. There were no significant differences between any of the groups on the Dieting subscale of the EAT-26.

Gender Role and Mindfulness

An analysis of variance (ANOVA) test revealed that there were no significant differences between the four gender role categories on the MAAS [$F(3, 129) = .42, p = .74$]. Among the four gender role categories, there were several significant differences in total KIMS scores and among the four subscales of the KIMS. Those classified as either Masculine, [$t(53) = 2.89, p = .001$], or Androgynous, [$t(58) = 3.95, p = .00$], reported significantly higher total KIMS scores than those classified as Undifferentiated. The Androgynous group also reported higher total mindfulness scores than those classified as Feminine, [$t(66) = -2.81, p = .01$].

Observe. No significant differences were found between the four gender role categories with respect to the Observe subscale of the KIMS.

Describe. The Masculine group reported significantly higher scores on the Describe subscale than both Feminine, [$t(61) = 2.48, p = .02$], and Undifferentiated individuals, [$t(53) = 4.05, p = .00$]. Similarly, the Androgynous group reported higher Describe scores than either the Feminine, [$t(66) = -2.45, p = .02$] or Undifferentiated groups, [$t(58) = 4.08, p = .00$].

Acceptance Without Judgment. Androgynous individuals reported significantly higher scores on the Acceptance subscale than those classified as Feminine, [$t(66) = -2.95, p = .00$]. No other between-group differences were observed.

Table 2

Distribution of Participants by Gender Role Category, Using the Median Split Method

	Frequency	Percent	Percent Male	Percent Female
Masculine	30	24.4	43.8	17.6
Feminine	33	26.8	18.8	29.7
Androgynous	35	28.5	15.6	33.0
Undifferentiated	25	20.3	21.9	19.8

Mindfulness and Disordered Eating

Mindfulness was significantly negatively correlated with disordered eating, as measured by total scores on the EAT-26. Both the KIMS, ($r = -.21, p = .02$) and the MAAS, ($r = -.32, p = .00$) were negatively associated with EAT-26 total scores, as well as with the Dieting, ($r = -.19, p = .03$ and $r = -.29, p = .00$, respectively), and Bulimia subscales of the EAT-26, ($r = -.28, p = .00$ and $r = -.37, p = .00$, respectively). The relationship between mindfulness and disordered eating differed by gender role category. For the masculine group ($N = 30$), mindfulness (as measured by the KIMS) was not related to disordered eating, ($r = -.34, p = .07$), while it was significantly related to disordered eating when measured using the MAAS, ($r = -.44, p = .02$). For the feminine group ($N = 33$), the opposite was true. Mindfulness was significantly related to disordered eating using the KIMS, ($r = -.35, p = .05$), but was not related to disordered eating, when assessed using the MAAS, ($r = -.18, p = .32$).

A significant negative correlation between mindfulness and disordered eating was observed for the androgynous group ($N = 35$); however, this was only evident when measured using the MAAS, ($r = -.45, p = .01$). When mindfulness was assessed by the KIMS, this relationship was not significant, ($r = -.30, p = .08$).

For the undifferentiated group ($N = 25$), there was no association between mindfulness and disordered eating, as assessed by either the KIMS, ($r = -.15, p = .45$), or the MAAS, ($r = -.19, p = .34$).

Mediational Analysis

The main hypothesis of this study was that mindfulness would mediate the

relationship between gender role and disordered eating. Baron and Kenny (1986) have identified the steps to performing a mediational analysis. First, the independent variable must influence the mediator. Secondly, the independent variable must influence the dependent variable, and thirdly, the mediator must influence the dependent variable. For mediation to occur, the influence of the independent variable on the dependent variable must decrease, once the mediator is added to the equation.

A standard multiple regression analysis was conducted with all four gender role categories entered simultaneously, and with mindfulness as the dependent variable. Vectors were created, to represent the differences among the independent variable (the four gender role categories). Gender role was a significant predictor of mindfulness, as measured by the KIMS, [$F(3, 119) = 6.03, p = .00, R^2 = .13$], but was not a significant predictor of mindfulness, when measured using the MAAS, [$F(3, 119) = .34, p = .80, R^2 = .01$]. Furthermore, gender role did not predict disordered eating in this sample, [$F(3, 119) = 1.26, p = .29, R^2 = .03$]. As the second condition required for mediation was not met, no further analyses were conducted. Thus, a mediational model of disordered eating was not supported (see Figure 2), suggesting that while gender role may be related to one's level of mindful awareness, it is not directly related to disordered eating.

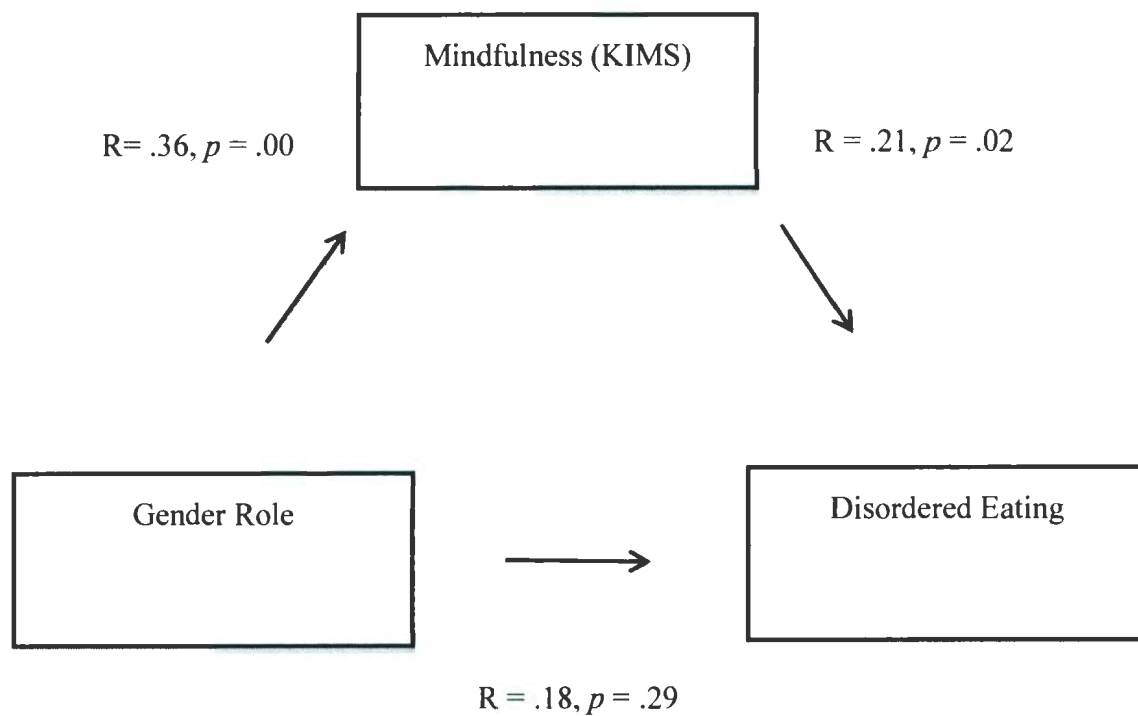
Discussion

The purpose of this study was to determine whether mindfulness would mediate the relationship between gender role and disordered eating. To accomplish this, an exploratory model of disordered eating was proposed and tested. Although the proposed mediational model was not supported, the results of this research did support the

contention that mindfulness is negatively associated with disordered eating, such that higher levels of mindfulness were related to lower levels of disordered eating among participants. This is an important finding, as it sheds some light on the possible protective properties of mindfulness. Although mindfulness has been used as an intervention for disordered eating, the role of dispositional mindfulness in disordered eating had yet to be examined. The findings of this research lend support for the notion that dispositional mindfulness may be related to an individual's likelihood of developing disordered eating patterns and behaviours. However, the associations between the two mindfulness measures and disordered eating differed. The Acceptance subscale of the KIMS was the only subscale that was associated with total scores on the EAT-26, and associated with 2 of the 3 subscales of the EAT-26 (Dieting and Bulimia). The MAAS was significantly associated with total scores on the EAT-26, as well as the Dieting and Bulimia subscales. This would suggest that awareness (as measured by the MAAS) and acceptance (KIMS) are more closely related to disordered eating than some of the other facets, such as describing and observing.

Currently, there are no published reports of mindfulness-based therapies being used in the treatment of anorexia nervosa, in the same way that it is being used to treat bulimia nervosa. The results of this research do not signify that mindfulness is not a useful adjunct to treatment for restrictive eating; rather the results obtained from this specific sample did not indicate a relationship between dispositional mindfulness and restrictive eating.

Figure 2. Summary of standard regression analyses for proposed mediational model of disordered eating.



There were fewer gender role differences in disordered eating than was expected. As noted, there were no differences between the four gender role categories, with respect to the Dieting subscale of the EAT-26. This subscale assesses general dieting behaviours, such as avoiding food with a high carbohydrate content and being aware of the caloric content of foods. The fact that all four gender role categories were equally likely to endorse the items pertaining to this scale was unanticipated. There were no gender role differences with respect to total scores on the EAT-26. Femininity has been closely linked to disordered eating in both non-clinical (Meyer et al., 2001) and clinical samples (Murnen & Smolak, 1997). Furthermore, androgyny has been related to positive mental health outcomes, including lower levels of disordered eating (Hepp et al., 2005; Meyer et al., 2001) and greater levels of self-esteem (Spence et al., 1975). Thus, it was expected that the androgynous group would report less disordered eating than the other three gender role categories. As there was little variance among the scores on the Masculine and Feminine scales of the BSRI, the four gender role categories did not differ very much from one another. This may have been one reason for these unexpected results. The sample did not exhibit much variance in their endorsement of either masculine or feminine characteristics, and thus the four groups may have been more similar than they were different from one another.

One of the interesting findings of this research was the large number of participants who were classified as undifferentiated (demonstrating a low number of both masculine and feminine traits). In the original study, Bem (1974) reported that only 1% of her college-aged sample were undifferentiated. This significant increase in undifferentiated

individuals may be due in part to shifting gender role expectations and the fluidity of gender roles themselves. John, Alwyn, Hodgson, and Phillips (2008) reported that 40% of their mixed-sex sample was undifferentiated, also measured using the BSRI. In this sample, an equal percentage of both males (22%) and females (20%) endorsed the undifferentiated gender role, suggesting that gender roles may be changing for both men and women. The students in this sample did not display wide variations in their age or ethnicity, so it is plausible that this cohort has grown up during a shift in the way that gender roles are conceptualized, leading to fewer differences among individuals than was the case with previous generations. The characteristics endorsed by males and females in the 1970's may not be representative of those which would be endorsed today. Thus, Bem's conceptualization of masculinity and femininity may be outdated, and these constructs may need to be revisited to see if they are still accurate.

The median split model advocated by Spence and colleagues (1975) and subsequently by Bem herself (1977) has some drawbacks that should be noted. While the original method of scoring involved calculating the t-ratio of the difference between each participant's masculinity and femininity scores, the median split model defines androgyny as any score higher than the sample median for both masculinity and femininity. This means that the difference between a masculine or an androgynous individual may be as little as one-tenth of a point. Rather than sex-typing being defined as a significantly greater degree of endorsement of either masculine or feminine traits, with the median split scoring method, an individual may be classified as sex-typed simply because they happened to be a fraction of a point above the sample median for either

masculinity or femininity and slightly below the sample median on the other. Thus, according to Sedney (1981), the BSRI can no longer be said to differentiate those who are significantly sex-typed from those who are not. Furthermore, because each sample will have its own medians, comparison between samples is made more difficult (Sedney, 1981). The same individual may be classified as masculine in one sample and as undifferentiated in another; thus, true comparison against other samples may not be possible (Sedney, 1981).

The median split model continues to be used in the majority of androgyny research, if not exclusively. It is important to bear in mind, however, that the categories of masculine, feminine, androgynous, and undifferentiated may not be so different from one another when interpreting and attempting to generalize the results of gender role research.

The MAAS and the KIMS did not perform as similarly as one might expect, given that they are both measures of mindfulness. The MAAS focuses primarily on awareness and attention to what is occurring in the present, while the KIMS incorporates this, as well as other aspects of mindfulness into the overall score. While the total scores for the KIMS were moderately correlated with the MAAS, the correlations between the individual subscales and the MAAS were small, and the Observe scale showed no relationship to the MAAS. Thus, the pattern of relationships between these two measures of mindfulness and disordered eating was not always the same. Only the Feminine group showed a relationship between total KIMS scores and disordered eating, while for the masculine and androgynous groups, the MAAS was significantly related to disordered eating. The results from the Undifferentiated group did not indicate any relationship

between mindfulness and disordered eating for either measure of mindfulness. The Acceptance subscale of the KIMS performed similarly to the MAAS, in terms of its relation to the subscales and total scores for the EAT-26.

While it appears that Acceptance is the more important aspect of mindfulness when it comes to disordered eating, the Observe and Act with Awareness subscales did each show some relation to one of the subscales of the EAT-26 (although not with total EAT-26 scores). Thus, it would appear that while non-judgmental acceptance is more closely related to disordered eating, it is not the only facet of mindfulness that may be beneficial. While the KIMS and the MAAS are widely used in mindfulness research, they might not be the best measures to use when looking at disordered eating. The lack of support for the proposed mediational model may be due, in part, to the mindfulness measures that were used. Therefore, it might be worthwhile to re-examine this research question using mindfulness measures specific to body image and eating pathology, such as the Body Image Acceptance and Action Questionnaire, created by Sandoz, Wilson, and Merwin (under review).

Limitations and Future Directions

Internal consistency for total EAT-26 scores was lower among males than females in this sample, although still acceptable, consistent with findings from previous college-aged samples (Boerner, Spillane, Anderson, & Smith, 2004). Future research should attempt to recruit more participants, which would lead to greater numbers within each of the gender role categories. As previously mentioned, the results of this research may have been limited by the limited number of participants in each of the four groups.

The sample used in the current study was taken from a large undergraduate psychology course, and thus, the sample may not be representative of all psychology students, or of students in general. Furthermore, of the 204 students enrolled in the course, only 134 (66%) volunteered to participate in the research study. It is unknown whether this group of students differs in some way from those who chose not to participate. The sample was composed mostly of females, with males comprising only 26% of the sample. Future researchers should attempt to secure a larger number of male participants. Also, due to the possibility that gender role may be more fluid among clinical samples (Hepp et al., 2005), it might be useful to follow a clinical sample of eating disordered patients to ascertain whether or not gender role does change over the course of the illness. This would give researchers a better idea of where future research should be directed.

As this research design was correlational in nature, the direction of the relationship between mindfulness and disordered eating is based on theory and could not be evaluated based on the analyses that were conducted. That is, it is not clear whether mindfulness decreases as disordered eating symptoms become more severe, or whether high levels of mindfulness lead to less disordered eating. It would be valuable to follow a sample of individuals over a period of time to see whether mindfulness and disordered eating do co-vary, and whether present mindfulness is predictive of an individual's likelihood to engage in disordered eating in the future. It would also be worthwhile to replicate this study with both a younger, and an older sample, to see if mindfulness is associated with disordered eating in early adolescence, or in later adulthood. Perhaps mindfulness does

not function as a buffer against disordered eating before a certain age, or later in life, as other variables begin to have a significant impact upon the individual (e.g. marriage, death of parent(s), chronic illness). As Midlarsky and Nitzburg (2008) noted, even if the individual has managed to overcome their disordered eating and develop a healthy relationship with food, the stresses involved with the transition to middle adulthood could contribute to a relapse.

While the results of this research suggest that mindfulness is associated with lower levels of disordered eating for men and women, the proposed meditational model was not supported. Thus, the mechanism by which mindfulness acts to influence an individual's likelihood of engaging in disordered eating is unclear. Further exploration is needed, to determine how mindfulness may be incorporated most beneficially into treatment for disordered eating.

The research literature has yet to examine the role of dispositional mindfulness and disordered eating. Mindfulness-based techniques have been applied to the treatment of bulimia nervosa and binge eating disorder, but research has not addressed whether dispositional mindfulness is related to one's tendency to engage in disordered eating behaviours. The results of this research do suggest that certain facets of dispositional mindfulness are associated with disordered eating in college-aged students. Namely, the tendency to remain attentive to, and non-judgmental of one's emotions, thoughts, and experiences was associated with less disordered eating in this sample. Using other indices of diatheses for disordered eating, individuals at risk could be targeted for a mindfulness intervention, with the aim of enhancing their mindfulness skills and thereby reducing the

likelihood that they will develop further symptoms of disordered eating.

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Appendix A

Psychology 2800 Drugs and Behaviour

In order to meet the requirements for this course, you are required to participate in research or to contribute an original position paper on a topic related to the course content. The total marks for this assignment is (2%) of your overall course grade. You may choose one of the following options to complete. Your completed assignment is due February 26, 2009 and can be dropped off at SN 2051 between the hours of 11-2 Tuesday–Thursday of that week.

Option 1: Research Participation (2%)

This study is looking at a number of mental health outcomes in a student population. It will involve completing a demographic questionnaire and (6) short questionnaires, which should take no longer than 30 minutes to complete. Your participation in this research is voluntary and you may withdraw your participation and/or data at any time. If you choose not to participate this will not affect your student status in any way.

There is the possibility of mild discomfort due to the personal nature of the questionnaire items. However, this risk is minimal and no foreseeable harms are anticipated. By participating in this research, you will earn (2) percentage points towards your final grade in this course. If you agree to participate in the research, you should know that your responses will remain confidential and no outside parties will have access to any data generated from this research. At the end of data collection, no student numbers or personally identifying information will be matched to your responses. The data will be stored in a password-protected file, which only the principal researcher, her academic supervisor and research assistants will have access to.

The proposal for this research has been approved by the Interdisciplinary Committee on Ethics in Human Research at Memorial University. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 737-8368. If you have any concerns about this research, you may also contact the principal research, Melody Sorenson at w29mks@mun.ca or her supervisor, Dr. Peter Mezo at mezo@mun.ca. If you feel you need to speak with someone immediately, you can contact the 24-Hour Mental Health Crisis Line at 1-888-737-4668

Option 2: Position Paper (2%)

You also have the option of completing a short position paper (1 page) on a topic relating to psychology for the same amount of credit (2 percentage points) should you choose not to be involved in this research. The topic for this paper will be “Should marijuana be legalized?” It is expected that you will put forth the same amount of effort that would be required to complete the questionnaires (30 minutes).

Thank you,
Melody Sorenson
M.Sc Candidate

Appendix B Informed Consent

The purpose of an informed consent form is to ensure that you, as the participant, understand the purpose of the study as well as the nature of your involvement.

Research Title: An exploratory investigation of the role of mindfulness as a mediator of the relationship between gender role and disordered eating.

Research personnel: For questions about this study please contact the principle researcher, Melody Sorenson (Department of Psychology, Memorial University of Newfoundland, melody.sorenson@mun.ca).

The proposal for this research has been approved by the Interdisciplinary Committee on Ethics in Human Research at Memorial University of Newfoundland (ICEHR). If you have any ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 737-8368.

Purpose: The purpose of this study is to provide insight into how people think and feel.

Task requirements: This study will involve you filling out a demographic form and then a series of short questionnaires.

Duration: This study should take approximately 30 minutes to complete.

Potential risks: You are under no obligation to continue the study if you experience discomfort or anxiety during any part of it, or if you feel uncomfortable to do so. We understand that completing questionnaires on mood and eating behaviours may cause personal distress. In the event that this does occur, we ask that you please contact the University Counselling Centre at UC5000, telephone 737-8874. In the event of extreme distress, please call the Health and Community Services Crisis line at 1-888-737-4668 where a counsellor will be available to speak with you immediately.

Benefits: Your participation in this study will be contributing toward research on thinking and behavior.

Anonymity and confidentiality: The data collected in this study are coded with a number that is not associated with your name and therefore all data are anonymous. The data will be used only by researchers associated with this project for the purpose of research publications, conference presentations, or teaching material. To ensure anonymity, please do not write your name anywhere on the questionnaires. As well, the informed consent forms will be kept separate from your questionnaires once returned. All informed consent forms will be stored confidentially in a locked filing cabinet.

Right to withdraw: Your participation in this study is entirely voluntary. At any point during the study you have the right to not answer any question or to withdraw with no penalty whatsoever.

Signatures: I have read the above description and I understand that the data in this study will be used in research publications or for teaching purposes. My signature indicates that I agree to participate in this study. I also confirm that I have reached the age of maturity for legal consent (19 years).

Participant's name: _____

Participant's Signature: _____

Date: _____

Student ID: _____

Please remove the completed Informed Consent Form from the experimental package and return to the researcher in a sealed envelope (provided). Thank you.

Appendix C
Demographics

1. Age: _____

2. Gender:

Male _____ Female _____

3. Ethnicity: (check all that apply)

Caucasian _____

Aboriginal _____

African American _____

Japanese _____

Chinese _____

Other _____

4. Sexual Orientation:

Heterosexual _____

Homosexual _____

Bisexual _____

Undisclosed _____

5. Have you, or anyone else in your immediate family ever been diagnosed with:

_____ An eating disorder?

_____ An anxiety disorder?

_____ Depression?

6. Do you have any experience with meditation (e.g. yoga)?

_____ Yes

_____ No

Appendix D
Bem Sex Role Inventory

BSRI

Using the following scale, please indicate the degree to which each statement describes you as a person.

- 1 = Never or almost never true
 2 = Usually not true
 3 = Sometime but infrequently true
 4 = Occasionally true
 5 = Often true
 6 = Usually true
 7 = Always or almost always true

Almost always true
 Usually true
 Often true
 Occasionally true
 Sometimes, but infrequently true
 Usually not true
 Almost never true

1. Self-reliant	1	2	3	4	5	6	7
2. Yielding	1	2	3	4	5	6	7
3. Helpful	1	2	3	4	5	6	7
4. Defends own beliefs	1	2	3	4	5	6	7
5. Cheerful	1	2	3	4	5	6	7
6. Moody	1	2	3	4	5	6	7
7. Independent	1	2	3	4	5	6	7
8. Shy	1	2	3	4	5	6	7
9. Conscientious	1	2	3	4	5	6	7
10. Athletic	1	2	3	4	5	6	7
11. Affectionate	1	2	3	4	5	6	7
12. Theatrical	1	2	3	4	5	6	7
	1	2	3	4	5		7

13. Assertive						6	
14. Flatterable	1	2	3	4	5	6	7
15. Happy	1	2	3	4	5	6	7
16. Strong personality	1	2	3	4	5	6	7
17. Loyal	1	2	3	4	5	6	7
18. Unpredictable	1	2	3	4	5	6	7
19. Forceful	1	2	3	4	5	6	7
20. Feminine	1	2	3	4	5	6	7
21. Reliable	1	2	3	4	5	6	7
22. Analytical	1	2	3	4	5	6	7
23. Sympathetic	1	2	3	4	5	6	7
24. Jealous	1	2	3	4	5	6	7
25. Has leadership abilities	1	2	3	4	5	6	7
26. Sensitive to the needs of others	1	2	3	4	5	6	7
27. Truthful	1	2	3	4	5	6	7
28. Willing to take risks	1	2	3	4	5	6	7
29. Understanding	1	2	3	4	5	6	7
30. Secretive	1	2	3	4	5	6	7
31. Makes decisions easily	1	2	3	4	5	6	7
32. Compassionate	1	2	3	4	5	6	7
33. Sincere	1	2	3	4	5	6	7
34. Self-sufficient	1	2	3	4	5	6	7
35. Eager to soothe hurt feelings	1	2	3	4	5	6	7
36. Conceited	1	2	3	4	5	6	7
37. Dominant	1	2	3	4	5	6	7
38. Soft spoken	1	2	3	4	5	6	7
39. Likable	1	2	3	4	5	6	7

40. Masculine	①	②	③	④	⑤	⑥	⑦
41. Warm	①	②	③	④	⑤	⑥	⑦
42. Solemn	①	②	③	④	⑤	⑥	⑦
43. Willing to take a stand	①	②	③	④	⑤	⑥	⑦
44. Tender	①	②	③	④	⑤	⑥	⑦
45. Friendly	①	②	③	④	⑤	⑥	⑦
46. Aggressive	①	②	③	④	⑤	⑥	⑦
47. Gullible	①	②	③	④	⑤	⑥	⑦
48. Inefficient	①	②	③	④	⑤	⑥	⑦
49. Acts as a leader	①	②	③	④	⑤	⑥	⑦
50. Childlike	①	②	③	④	⑤	⑥	⑦
51. Adaptable	①	②	③	④	⑤	⑥	⑦
52. Individualistic	①	②	③	④	⑤	⑥	⑦
53. Does not use harsh language	①	②	③	④	⑤	⑥	⑦
54. Unsystematic	①	②	③	④	⑤	⑥	⑦
55. Competitive	①	②	③	④	⑤	⑥	⑦
56. Loves children	①	②	③	④	⑤	⑥	⑦
57. Tactful	①	②	③	④	⑤	⑥	⑦
58. Ambitious	①	②	③	④	⑤	⑥	⑦
59. Gentle	①	②	③	④	⑤	⑥	⑦
60. Conventional	①	②	③	④	⑤	⑥	⑦

Appendix E
Eating Attitudes Test-26

EAT-26

Please circle a response for each of the following items:

- 1 = Always
2 = Usually
3 = Often
4 = Sometimes
5 = Rarely
6 = Never

Always
Usually
Often
Sometimes
Rarely
Never

1. Am terrified about being overweight.	①	②	③	④	⑤	⑥
2. Avoid eating when I am hungry.	①	②	③	④	⑤	⑥
3. Find myself preoccupied with food	①	②	③	④	⑤	⑥
4. Have gone on eating binges where I feel I may not be able to stop.	①	②	③	④	⑤	⑥
5. Cut my food into small pieces	①	②	③	④	⑤	⑥
6. Aware of the calorie content of foods I eat	①	②	③	④	⑤	⑥
7. Particularly avoid foods with a high carbohydrate content (breads, rice, etc.)	①	②	③	④	⑤	⑥
8. Feel that others would prefer if I ate more	①	②	③	④	⑤	⑥
9. Vomit after I have eaten	①	②	③	④	⑤	⑥
10. Feel extremely guilty after eating	①	②	③	④	⑤	⑥
11. Am preoccupied with a desire to be thinner	①	②	③	④	⑤	⑥
12. Think about burning up calories when I exercise	①	②	③	④	⑤	⑥
13. Others think I am too thin	①	②	③	④	⑤	⑥

14. Am preoccupied with the thought of having fat on my body	①	②	③	④	⑤	⑥
15. Take longer than others to eat my meal	①	②	③	④	⑤	⑥
16. Avoid foods with sugar in them	①	②	③	④	⑤	⑥
17. Eat diet foods	①	②	③	④	⑤	⑥
18. Feel that food controls my life	①	②	③	④	⑤	⑥
19. Display self-control around food	①	②	③	④	⑤	⑥
20. Feel that others pressure me to eat	①	②	③	④	⑤	⑥
21. Give too much time and thought to food	①	②	③	④	⑤	⑥
22. Feel uncomfortable after eating sweets	①	②	③	④	⑤	⑥
23. Engage in diet behavior	①	②	③	④	⑤	⑥
24. Like my stomach to be empty	①	②	③	④	⑤	⑥
25. Have the impulse to vomit after meals	①	②	③	④	⑤	⑥
26. Enjoy trying new rich foods	①	②	③	④	⑤	⑥

Appendix F
Kentucky Inventory of Mindfulness Skills

KIMS

For each statement below, please shade the number that most accurately represents what is generally true for you.

- 1 = never or very rarely true
 2 = rarely true
 3 = sometimes true
 4 = often true
 5 = very often or always true

never true rarely true sometimes true often true always true

- | | | | | | |
|---|---|---|---|---|---|
| 1. I notice changes in my body, such as whether my breathing slows down or speeds up. | ① | ② | ③ | ④ | ⑤ |
| 2. I'm good at finding the words to describe my feelings. | ① | ② | ③ | ④ | ⑤ |
| 3. When I do things, my mind wanders off and I'm easily distracted. | ① | ② | ③ | ④ | ⑤ |
| 4. I criticize myself for having irrational or inappropriate emotions. | ① | ② | ③ | ④ | ⑤ |
| 5. I pay attention to whether my muscles are tense or relaxed. | ① | ② | ③ | ④ | ⑤ |
| 6. I can easily put my beliefs, opinions, and experiences into words. | ① | ② | ③ | ④ | ⑤ |
| 7. When I'm doing something, I'm only focused on what I'm doing, nothing else. | ① | ② | ③ | ④ | ⑤ |
| 8. I tend to evaluate whether my perceptions are right or wrong. | ① | ② | ③ | ④ | ⑤ |
| 9. When I'm walking, I deliberately notice the sensations of my body moving. | ① | ② | ③ | ④ | ⑤ |
| 10. I'm good at thinking of words to express my perceptions, such as how things taste, smell, or sound. | ① | ② | ③ | ④ | ⑤ |

11. I drive on "automatic pilot" without paying attention to what I'm doing.	①	②	③	④	⑤
12. I tell myself that I shouldn't be feeling what I'm feeling.	①	②	③	④	⑤
13. When I take a shower or a bath, I stay alert to the sensations of water on my body.	①	②	③	④	⑤
14. It's hard for me to find the words to describe what I am thinking.	①	②	③	④	⑤
15. When I'm reading, I focus all of my attention on what I am reading.	①	②	③	④	⑤
16. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	①	②	③	④	⑤
17. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.	①	②	③	④	⑤
18. I have trouble thinking of the right words to express how I feel about things.	①	②	③	④	⑤
19. When I do things, I get totally wrapped up in them and don't think about anything else.	①	②	③	④	⑤
20. I make judgments about whether my thoughts are good or bad.	①	②	③	④	⑤
21. I pay attention to sensations, such as the wind in my hair or sun on my face.	①	②	③	④	⑤
22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.	①	②	③	④	⑤
23. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.	①	②	③	④	⑤
24. I tend to make judgments about how worthwhile or worthless my experiences are.	①	②	③	④	⑤
25. I pay attention to sounds, such as clocks ticking,	①	②	③	④	⑤

	birds chirping, or cars passing.					
26.	Even when I'm feeling terribly upset, I can't find a way to put it into words.	①	②	③	④	⑤
27.	When I'm doing chores, such as cleaning or laundry, I tend to daydream or think of other things.	①	②	③	④	⑤
28.	I tell myself that I shouldn't be thinking the way I'm thinking.	①	②	③	④	⑤
29.	I notice the smells and aromas of things.	①	②	③	④	⑤
30.	I intentionally stay aware of my feelings.	①	②	③	④	⑤
31.	I tend to do several things at once rather than focusing on one thing at a time.	①	②	③	④	⑤
32.	I think some of my emotions are bad or inappropriate and I shouldn't feel them.	①	②	③	④	⑤
33.	I notice visual elements in art of nature, such as colors, shapes, textures, or patterns of light and shadow.	①	②	③	④	⑤
34.	My natural tendency is to put my experiences into words.	①	②	③	④	⑤
35.	When I'm working on something, part of my mind is occupied with other topics, such as what I'll be doing later, or what I'd rather be doing.	①	②	③	④	⑤
36.	I disapprove of myself when I have irrational ideas.	①	②	③	④	⑤
37.	I pay attention to how my emotions affect my thought and behaviour.	①	②	③	④	⑤
38.	I get completely absorbed in what I'm doing, so that all my attention is focused on it.	①	②	③	④	⑤
39.	I notice when my moods begin to change.	①	②	③	④	⑤

Appendix G
Mindful Attention and Awareness Scale

MAAS

Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what *really reflects* your experience rather than what you think your experience should be.

- 1 = *Almost always*
- 2 = *Very frequently*
- 3 = *Somewhat frequently*
- 4 = *Somewhat infrequently*
- 5 = *Very infrequently*
- 6 = *Almost never*

	Almost always	Very frequently	Somewhat frequently	Somewhat infrequently	Very infrequently	Almost never
1. I could be experiencing some emotion and not be conscious of it until some time later.	①	②	③	④	⑤	⑥
2. I break or spill things because of carelessness, not paying attention, or thinking of something else.	①	②	③	④	⑤	⑥
3. I find it difficult to stay focused on what's happening in the present.	①	②	③	④	⑤	⑥
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	①	②	③	④	⑤	⑥
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	①	②	③	④	⑤	⑥
6. I forget a person's name almost as soon as I've been told it for the first time.	①	②	③	④	⑤	⑥
7. It seems I am 'running on automatic' without much awareness of what I'm doing.	①	②	③	④	⑤	⑥
8. I rush through activities without being really attentive to them.	①	②	③	④	⑤	⑥

- | | | | | | | | |
|------------|---|---|---|---|---|---|---|
| 9. | I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there. | ① | ② | ③ | ④ | ⑤ | ⑥ |
| 10. | I do jobs or tasks automatically, without being aware of what I'm doing. | ① | ② | ③ | ④ | ⑤ | ⑥ |
| 11. | I find myself listening to someone with one ear, doing something else at the same time. | ① | ② | ③ | ④ | ⑤ | ⑥ |
| 12. | I drive places on 'automatic pilot' and then wonder why I went there. | ① | ② | ③ | ④ | ⑤ | ⑥ |
| 13. | I find myself preoccupied with the future or the past. | ① | ② | ③ | ④ | ⑤ | ⑥ |
| 14. | I find myself doing things without paying attention. | ① | ② | ③ | ④ | ⑤ | ⑥ |
| 15. | I snack without being aware that I'm eating. | ① | ② | ③ | ④ | ⑤ | ⑥ |



